Spaulding Turnpike Improvements NHS-027-1(37), 11238

Newington to Dover, New Hampshire

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NEWINGTON-DOVER
SPAULDING TURNPIKE IMPROVEMENTS
STRAFFORD AND ROCKINGHAM COUNTIES, NEW HAMPSHIRE

DRAFT
ENVIRONMENTAL IMPACT STATEMENT

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by the
US Department of Transportation
Federal Highway Administration
And
New Hampshire Department of Transportation

Cooperating Agencies

US Army Corps of Engineers
US Environmental Protection Agency
US Coast Guard
US Fish and Wildlife Service
National Marine Fisheries Service

Federal Aviation Administration
NH Division of Historical Resources
NH Department of Environmental Services
NH Fish and Game Department
NH Office of Energy and Planning

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Date of Approval

James A. Moore
For NH Department of Transportation

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For Federal Highway Administration

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The proposed project involves reconstruction and widening of a 3.5-mile section of an existing highway facility (Spaulding Turnpike/NH 16, extending north from the Gosling Road/Pease Boulevard Interchange (Exit 1) in the Town of Newington, across the Little Bay Bridges, to a point just south of the existing toll facility in the City of Dover) that serves as a major north-south transportation link for the State of New Hampshire. The proposed action would improve safety and increase transportation efficiency by relieving traffic congestion and reducing travel time, and accommodate projected increases in traffic demand. Alternatives considered in this EIS include (1) taking no action; (2) upgrading the existing route to add capacity; (3) applying Travel Demand Management (TDM) measures, such as transit system expansion, additional park-and-ride lots, high occupancy vehicle lanes, *etc.*; (4) applying Transportation System Management (TSM) improvements to selected interchange locations and existing roads; and (5) combinations of these alternatives. Various options for bridge rehabilitation, widening, and/or replacement of the Little Bay Bridges, final disposition of the historic General Sullivan Bridge, consolidation of the interchanges, and various designs of grade, alignment, and geometry were evaluated. Impacts to the natural, cultural, and socio-economic environment were analyzed, including the indirect and cumulative impacts associated with the project. Mitigation is proposed to offset or reduce unavoidable direct impacts associated with the project.

Agencies listed above have been invited to be Cooperating Agencies for the EIS process and representatives have participated in appropriate project coordination meetings.

Table of Contents

Executive Summary ES-1

A. Project Description /Purpose and Need ES-1
A.1 Study Area Description ES-1
A.2 Purpose and Need ES-2
B. Description of Preferred Alternative ES-4
C. Project History ES-9
D. Alternatives Considered ES-10
E. Summary of Beneficial and Adverse Effects of Preferred Alternative ES-12
E.1 Adverse Effects ES-12
E.2 Beneficial Effects ES-17
F. Issues and Areas of Controversy ES-18
G. Other Governmental Actions ES-21
H. Major Unresolved Issues ES-21
I. Federal and State Actions Required for the Implementation of Proposed Action ES-21

List of Figures

Figure No.	Description
1.2-2	Project Study Area
2.4-25	Newington Alternative 13
2.4-28	Dover Alternative 3
2.5-1	Summary of Environmental Impacts
2.6-2	Summary of Costs, Eight-Lane Alternatives

Executive Summary

A. Project Description/Purpose and Need

A.1 Study Area Description

The section of Spaulding Turnpike (NH 16) under study is approximately 3.5 miles long, extending from just north of Exit 1 in Newington to just south of the Dover Toll Plaza, including the Little Bay Bridges. Most of this section of the Turnpike is a limited access (fully controlled) facility and consists of two (2) through lanes in each direction separated by a median of varying width. The study area includes five interchange areas (Exits 2, 3, 4, 5 and 6) to accommodate access and turning movements in a relatively short section of the Turnpike. The Turnpike is part of the National Highway System and is functionally classified as a principal arterial connecting the Seacoast Region with Concord, the Lakes Region and the White Mountains.

Poor traffic flow conditions can be attributed to two separate factors: physical infrastructure deficiencies and high traffic volumes. Physical deficiencies along the Turnpike include substandard curvature along interchange ramps, inadequate acceleration and deceleration lanes at interchanges, inadequate weave distances between the interchange ramps, and substandard shoulder widths on the Little Bay Bridges. These factors, combined with high traffic volumes, often result in reduced travel speeds, constrained maneuverability, and congestion during the peak hour conditions, as well as the increased potential for crashes and its negative effect on safety.

Crash data supports the diminishing level of safety along this section of the Turnpike. Over a seven-year period, from January 1997 through December 2003, a total of 1,263 crashes were recorded in the study area, with an overall crash growth rate of 14 percent per year. This yearly growth rate is approximately six times higher than the rate of traffic growth (2.3 percent) along the Turnpike during the same time period and a strong indicator of the deteriorating level of safety.

In addition to the physical deficiencies of the Spaulding Turnpike, the traffic volume demands on the corridor also contribute toward the poor traffic flow. During the commuter weekday peak hours (7:00-8:00 AM, 5:00-6:00 PM), study area motorists traveling along the Spaulding Turnpike currently experience

traffic congestion and substantial delay. With the Little Bay Bridges currently carrying in excess of 70,000 vehicles per day, many of the freeway segments and interchanges along the highway experience volume demands that exceed the available capacity of the roadway system. Traffic forecasts for the year 2025 project traffic to increase from its current level to approximately 94,600 vehicles per day.

A.2 Purpose and Need

The project Purpose and Need statement is fundamental to the analysis of the project under the National Environmental Policy Act (NEPA), the Clean Water Act (Section 404), and other environmental regulations. The following Purpose and Need was developed in conjunction with a public Advisory Task Force (ATF), reviewed by other State and Federal agencies with no objections, and unanimously adopted by the ATF on October 29, 2003.

Purpose

The purpose of this project is to improve transportation efficiency and reduce safety problems, while minimizing social, economic, and environmental impacts, for an approximate 3.5-mile section of the Spaulding Turnpike extending north from the Gosling Road/Pease Boulevard Interchange (Exit 1) in the Town of Newington, across the Little Bay Bridges, to a point just south of the existing Toll Plaza in the City of Dover. Options that include implementing Transportation System Management (TSM) improvements, reusing the General Sullivan Bridge for local motorized and non-motorized traffic, enhancing rail service, improving bus transit service and instituting other Transportation Demand Management (TDM) strategies that may reduce vehicle trips along the Spaulding Turnpike have been considered, in addition to widening the mainline, widening and/or replacing the Little Bay Bridges, and reconstructing the interchanges.

Need

The Spaulding Turnpike is eastern New Hampshire's major limited access north-south highway, serving as a gateway linking the Seacoast Region with Concord, the eastern portion of the Lakes Region, and the White Mountains. The Turnpike is also part of the National Highway System reflecting its significance as an important transportation link in the state and regional system. Functionally classified as a principal arterial, it is a major commuter route which ties the growing residential areas of Dover-Somersworth-Rochester with the industrial and regional commercial centers in Newington, Portsmouth, and northern Massachusetts. It serves as the major artery for freight into and out of the areas north of the Little Bay Bridges, and is the economic lifeline of the region. It also serves as a major tourist route, providing access to the northern reaches of the state from the seacoast and points south of New Hampshire.

Traffic volumes on the Little Bay Bridges have steadily increased from approximately 30,000 vehicles per day in 1980 to greater than 70,000 vehicles per day in 2003 resulting in high levels of congestion on the bridges and along the Turnpike near and within the interchange areas.

Over the next 20 years this average daily volume is expected to increase to approximately 94,600 (2025) vehicles per day. These projections support the conclusion that the existing facility will be increasingly less able to operate at the levels of service and safety for which it was originally designed. During weekday and weekend peak hours of the day, the Turnpike currently operates at unacceptable levels of service (LOS E and/or F) with motorists experiencing severe congestion and long delays within this segment of the corridor.

The Turnpike has a number of existing geometric deficiencies including substandard shoulder width on the Little Bay Bridges and substandard merge, diverge, and weave areas at the interchanges. Many of the traffic maneuvers required to enter, exit or change lanes along this section of the Turnpike are capacity-constrained under current traffic conditions and contribute to driver discomfort and crashes. Existing acceleration, deceleration and weaving sections along the Turnpike are inadequate by current design standards. Historic crash data indicates that the frequency of vehicle crashes continues to increase raising concerns relative to motorist safety. Due to the nature of the existing facilities, these crashes, as well as vehicle breakdowns, create long delays in an area for which there are no viable alternate routes.

In addition to the capacity deficiencies and safety issues, this section of the Turnpike bisects residential and recreational areas in Dover and the residential and commercial/industrial areas in Newington resulting in an inefficient and circuitous use of the Turnpike by people desiring to travel east-west and vice versa. Local connectivity for motorists, pedestrians, and bicyclists from one side of the Turnpike to the other is also deficient.

This section of the Turnpike is located in a moderate seismic region, identified as Seismic Performance Category B. The Little Bay Bridges and General Sullivan Bridge, which are classified as major structures, were not designed to meet the current seismic design criteria for this region.

The project is included in the State's Ten-Year Transportation Improvement Program and is the top long-term transportation priority of the Seacoast Metropolitan Planning Organization (MPO). As residential and commercial development and traffic growth along the corridor and within the region continue to increase, traffic operations and safety conditions will deteriorate further, resulting in increased vehicle delays, increased crash frequency, and the potential loss of commerce.

B. Description of Preferred Alternative

Based on the evaluation of the reasonable range of project alternatives, and on public comments, input from resource agencies, the Advisory Task Force, Rockingham Regional Planning Commission, and Strafford Regional Planning Commission, and considering safety, transportation efficiency, cost, impacts to the environment, impacts to private property, permitting issues, and community support, the following combination of transportation elements has been determined to represent the Preferred Alternative. It best balances the impacts and issues in addressing the project's Purpose and Need:

- Rehabilitate/Widen the Little Bay Bridges (LBB) to eight lanes (three general purpose lanes plus an auxiliary lane in each direction) maintaining the existing easterly edge of the bridge and widening entirely to the west.
  - Eight lanes on the bridges would provide an adequate level of service (LOS D) for the projected travel demand in 2025 and would offer satisfactory levels of service for an additional 10 to 12 years beyond the design year (based on extrapolating the projected traffic growth).
  - The three general purpose lanes plus an auxiliary lane in each direction (*i.e.,* eight lanes in total) on the Turnpike would extend between Exits 3 and 6. Six lanes in total would extend south of Exit 3 to match into the exiting cross-section of the Turnpike at Exit 1 and would extend through Exit 6 to the Dover toll plaza.
  - The existing profile of the Little Bay Bridges (suitable for 60 mph design criteria) would be maintained, as would the existing vertical clearance over the channel.
  - The bridge rehabilitation would involve replacing the existing bridge decks, modifying the steel girders to upgrade the pin and hanger connections, repainting the steel girders, and seismically retrofitting the existing pier columns.
  - Bridge construction would be completed in two phases with traffic maintained on the existing bridges while the proposed bridge widening is constructed and traffic shifted onto the widened section of the bridge while the existing bridges are rehabilitated.
  - Widening westerly (towards the General Sullivan Bridge) would minimize the impacts to Little Bay and Hilton Park.
  - Cost of the Little Bay Bridge Rehabilitation and widening is estimated to be approximately $55.5 million.
- Rehabilitate the General Sullivan Bridge (GSB) to a six-ton loading capacity to continue to function as a pedestrian/bicycle/recreational facility and to

accommodate emergency response and maintenance vehicles from Newington

- The GSB is a historic landmark structure. It is the second highest rated historic bridge in the state, eligible for the National Register of Historic Places, and identified as a highly valued Section 4(f) resource.
- The GSB is currently an important bike/pedestrian connection across Little Bay and is used for fishing and other recreational activity. These transportation connections and recreational activities will be more pleasurable on the GSB in comparison to the use of a multi-use path attached to the widened Little Bay Bridges, which will carry a large volume of vehicles at highway speed.
- Retaining the GSB as part of the Preferred Alternative requires the removal of the GSB's northerly approach embankment and wingwalls to facilitate the proposed reconstruction of a local access connector under the LBB. The existing concrete wingwall along the approach embankment would be removed essentially exposing the back of the GSB abutment. With the removal of the northerly approach embankment, a new 280-foot long pedestrian/bike path including a 155-foot pedestrian/bicycle structure is proposed that would connect the northerly end of the GSB with the local access road sidewalk and with Hilton Park.
- The estimated cost to rehabilitate the GSB to a six-ton capacity is approximately $23.0 million. The rehabilitation would involve the complete replacement of the deck and supporting structural system (*i.e.* floor beams and stringers), other miscellaneous repairs to the structural steel to arrest future corrosion, cleaning and painting the entire structure, and repairing the substructure (patching spalls and repointing the masonry). A seismic retrofit to primarily prevent the potential collapse of the structure will include at a minimum, a bearing retrofit. The net additional cost to the project of rehabilitating the GSB is estimated to be approximately $9.7 million, or approximately 5 percent of total project costs taking into account $5.0 million for the structure's removal and $8.3 million to replace the recreational connection across the Bay with a 16-foot wide multi-use path attached to the Little Bay Bridges. This does not take into account the cost of the necessary mitigation should the GSB be removed, which would further reduce the net cost difference.

- Alternative 3 in Dover
  - This Alternative provides a full service interchange at Exit 6 and improves both system and local connectivity for the neighborhoods on both sides of the Turnpike and US 4, and for travelers heading easterly on US 4 towards Dover and northerly on the Turnpike.

- The proximity of the signalized diamond-type interchange at Exit 6 necessitates the closing of the Cote Drive on-ramp to the Turnpike.
- A two-lane northbound off-ramp widening to provide dual left and right turn lanes at its intersection with US 4 is proposed to handle the heavy volume of traffic exiting the northbound Turnpike at Exit 6.
- A new two-way bridge (replacing the existing westbound only bridge) would be constructed to carry US 4 over the Turnpike.
- Signals would be installed at the northbound ramps and at the southbound on-ramp. A third signal could potentially be required at the Dover Point Road intersection to provide safe egress for the neighborhood.
- A bridge would be constructed to carry US 4 over a new local connector roadway between Spur Road and Boston Harbor Road. This grade-separated facility provides a local connection for the neighborhoods north and south of US 4 and eliminates the need for a traffic signal at the Boston Harbor Road/ US 4 intersection, where turns would be restricted to right turns in and out only. A short on-ramp from this local connector to the southbound on-ramp from US 4 would maintain convenient access from the Dover Point neighborhoods and Hilton Park, while reducing some of the traffic demand at the Boston Harbor Road/ US 4 intersection.
- The Exit 5 off and on-ramps would be discontinued. The proximity of these ramps to the reconfigured Exit 6 would create traffic operational and safety problems. In addition, upgrading the geometry of the Exit 5 interchange to current standards would impact Hilton Park. Access to the park and Wentworth Terrace will be provided *via* a new two-way local connector road traversing under the Little Bay Bridges adjacent to the channel.
- An underpass utilizing the existing traveled way beneath the Little Bay Bridges is proposed to connect the east and west sides of Hilton Park and the residential neighborhoods. The existing roadway would be widened to accommodate two-way travel at a design speed of 20 mph. This underpass location provides the benefit of utilizing an existing grade-separated crossing as opposed to locating a grade-separated crossing further north, which would necessitate elevating the Turnpike and increasing noise and aesthetic concerns for the surrounding properties. The existing east-west pedestrian and bicycle connection at this location will be maintained.
- Sound barriers are proposed on both the east and west sides of the Turnpike between the LBB and Exit 6 which will mitigate for the elevated noise levels. Sound barriers are also proposed on both the east and west sides of the Turnpike north of Exit 6.

- The construction cost of Alternative 3 is estimated to be approximately $39.5 million.

- Alternative 13 in Newington
  - This alternative provides a reconfigured full service interchange at Exit 3 (Woodbury Avenue), a northern access into the Tradeport, and maintains on and off-ramps to provide full access at Nimble Hill Road and Shattuck Way at Exit 4.
  - This alternative also eliminates the ramps at Exit 2 (rerouting traffic to Exit 3), and includes provisions for a future Railroad Spur over the Turnpike into the Pease Tradeport should the need arise. Right-of-way and easements will be procured as part of the project and a portion of the railroad bridge's pier foundation will be constructed within the median of the Turnpike. An agreement between the NHDOT and the Pease Development Authority (PDA) with concurrence from FHWA will also be secured as part of the project to outline a shared cost arrangement should the rail spur be constructed in the future.
  - The ExxonMobil gas station/convenience store will continue to operate at its current location. However, access to the station from the Nimble Hill Road ramps will be precluded. A local roadway, which would provide access to the gas station, Thermo Electron, and one other parcel (with existing direct access to the Turnpike) is proposed. This local roadway could also provide access to the former drive-in property *via* the roadbed of the existing southbound Turnpike (once discontinued) should that property be developed in the future.
  - Woodbury Avenue would be reconstructed to extend the two existing lanes in each direction with a center-raised median from the Fox Run Road intersection through the Exit 3 interchange area. A reduced cross-section is proposed in front of the Isaac Dow house and Beane Farm property to minimize impacts to these two historic resources.
  - In conjunction with the Interim Safety Improvement project, this alternative improves local connectivity by providing a direct connection (via Shattuck Way) between the east and west sides of the Turnpike, and provides a local connection between Woodbury Avenue and the Tradeport.
  - Bridge work will include the construction of a 3-span structure to carry Woodbury Avenue over the Turnpike, and widening and rehabilitation of the structure carrying the Turnpike over Shattuck Way.
  - Two signals are proposed, one each at the intersection of the northbound and southbound Exit 3 ramps with Woodbury Avenue.
  - The construction cost of Alternative 13 is estimated to be approximately $39.8 million.

- Of the various Transportation System Management elements that were identified for the project:
  - Improving the deceleration condition and signing at northbound Exit 6W have been completed.
  - Improving the signing on the LBB to emphasize the "no lane change zone" on the bridge has been completed.
  - The Interim Safety Improvement Project at Exit 4 in Newington is under construction and scheduled to be completed in 2006. As part of the project, an auxiliary lane between Exits 3 and 4 northbound will be created to improve traffic merging from Woodbury Avenue onto the Turnpike.
  - One other TSM element that is recommended will provide short-term relief at Exit 6 by re-striping the Exit 6 southbound on-ramp area to create two through lanes on the Turnpike and a one-lane on-ramp from US 4. Temporary closure of the southbound on-ramp from Boston Harbor Road would be required. This would cost approximately $100,000.

- A number of Travel Demand Management actions are proposed to complement the bridge and roadway infrastructure improvements. Early implementation of these actions will also provide greater options to study area commuters during construction.
  - A new park-and-ride facility consisting of 416 spaces is proposed for the Exit 9 area in Dover. The facility is under design and will be constructed as a separate project under the federal Congestion Mitigation and Air Quality (CMAQ) program. Construction is scheduled for 2006 with completion in 2007 to coincide with the planned Cooperative Alliance for Seacoast Transportation (COAST) express bus service and Dover's downtown transit loop service.
  - A park-and-ride facility consisting of approximately 200 spaces is proposed for the Exit 13 area in Rochester. The NHDOT recommends that this project be addressed either under the CMAQ program or as part of the Rochester 10620H project (currently planned to advertise in 2008).
  - A park-and-ride facility consisting of approximately 30 to 50 spaces is recommended for the US 4/NH 125 intersection area in Lee to accommodate travelers using US 4 eastbound. The NHDOT also recommends advancement of this project under the CMAQ program.
  - To improve bus service in the seacoast area and reduce peak hour headways to provide a more attractive and reliable mass transit mode of travel, three bus alternatives will be advanced.

- Bus Alternative 1 involves expanded intercity service for Rochester, Dover, Portsmouth and Boston to serve the commuter market.
- Bus Alternative 2 involves expanding the 2006 planned COAST express bus service among Rochester, Dover, and Portsmouth to reduce headways during the peak period for the planned express commuter bus service.
- Bus Alternative 3 involves improving connectivity and headways for three existing bus routes: COAST Route 2 service between Rochester and Portsmouth, Wildcat Transit Route 4 service between Durham and Portsmouth, and COAST Tradeport Trolley services which connects these two routes with the Tradeport.

- Expansion of the *Downeaster* service is also proposed. A joint-sponsored CMAQ proposal (total cost $6.0 million) by the Maine DOT, NHDOT and Northern New England Passenger Rail Authority (NNEPRA) (Rail Alternative 1C) would fund track and siding improvements in Maine and New Hampshire which would allow NNEPRA to operate a fifth weekday roundtrip (current service is four roundtrips per weekday) between Portland and Boston. In addition, commuter peak period service would improve with the arrival of the weekday AM commuter train in Boston at 8:00 AM, as opposed to 9:00 AM which is the current schedule. The NHDOT is advancing this effort through a $1.7 million CMAQ application.
- To support the promotion of employer-based measures to encourage travel other than by SOV, it is recommended that funding for the seacoast area TMA, Seacoast Commuter Options, be provided to help extend the service for a period of five years. The TMA is aggressively promoting its ride-share and guaranteed-ride-home programs and meeting with seacoast employers to offer cost-effective commuting alternatives. This extension of funding could be accomplished through the CMAQ program or with project-related funds.

C. Project History

This section of the Turnpike evolved from a two-lane facility when the General Sullivan Bridge was constructed in 1935 to the current median divided four-lane highway with five interchanges in a very compact and constrained area. The first Little Bay Bridge (currently carrying southbound traffic) was constructed in 1966 with the second bridge carrying northbound traffic constructed in 1984. When the northbound Little Bay Bridge was constructed in 1984, the General Sullivan Bridge was closed to motor vehicles and the Turnpike approaches were realigned with the Little Bay Bridges. Much of the current Spaulding Turnpike mainline roadway section still predates the Little Bay Bridges. The most recent substantial roadway modifications were related to the reconstruction of the

Scammell Bridge over the Bellamy River (completed in 1999). That project included improvements to the ramp system from US 4, Boston Harbor Road and Dover Point Road to the Spaulding Turnpike southbound.

Recognizing a need to study potential improvements to address safety concerns and increased congestion, State Senate Bill 152-FN-A (1990) authorized the NHDOT to conduct a study of the approximately 3.5-mile section of the Spaulding Turnpike extending north from Exit 1 (Gosling Road) in Newington and traversing the Little Bay Bridges to (but not including) the Dover Toll Plaza just north of Exit 6. The study was initiated in 1990, but suspended in 1992 to allow completion of the Pease Surface Transportation Master Plan. In 1997, the Newington-Dover Feasibility Study was initiated to conceptually develop both a short-range plan to address existing safety deficiencies, and a range of long-term improvement alternatives to be carried forward for detailed engineering and environmental studies. The feasibility study was completed in 2000.

In 1998, the Route 16 Corridor Protection Study articulated a vision for the corridor (Portsmouth to Errol) to guide future growth and identified a number of planning principles and techniques to address the following major areas of concern: transportation, community design, travel and tourism, and land use and access management. The vision for the corridor and study findings and recommendations resulted from a cooperative effort of working groups of people, who reside and work in the corridor with support from State and regional planners. As part of the study, which underscores the linkage among transportation, economy and land use, 1997 and future (2017) year travel conditions along the corridor – including the Spaulding Turnpike – were evaluated taking into account future changes in land use and transportation improvement projects that were programmed for project development.

The Corridor Protection Study's traffic analysis indicated that while the section of Turnpike north of the Dover Toll Plaza would operate at a satisfactory level of service under future (2017) conditions, the 3.5-mile study area section of Turnpike between the Dover Toll Plaza and Exit 1 (Gosling Road) in Newington is capacity-constrained under both 1997 and 2017 future traffic conditions.

Within the framework of an EIS, this current study identifies, evaluates and recommends a long-term transportation and safety solution for this study area that is supported by community stakeholders and addresses the project's purpose and need.

D. Alternatives Considered

Based upon the results of the initial development, refinement, review and screening of alternatives, the following alternatives were endorsed by the ATF

(June 23, 2004) and were carried forward into the development of this DEIS for further detailed evaluation:

- The No-Build Alternative, which essentially serves as a basis for purposes of comparison with the Build Alternatives.

- Transportation Systems Management (TSM) measures, as described previously, that address current traffic operational and safety problem areas.

- Travel Demand Management (TDM) measures, which will provide alternatives to single occupancy vehicular travel. Specifically, the following measures were carried forward:
  - Rail Alternative 1A – Expanded *Downeaster* Service to Dover
  - Rail Alternative 1B – Expanded *Downeaster* Service to Rochester
  - Rail Alternative 1C – Expanded *Downeaster* Service to Dover (NNEPRA/MaineDOT proposal)
  - Restoration or preservation of the Pease Spur railroad corridor.
  - Bus Alternative 1 – Expanded Intercity Bus Service (Rochester-Boston).
  - Bus Alternative 2 – Expanded Express Bus Service (Rochester-Portsmouth).
  - Bus Alternative 3 – Expanded Local Bus Service.
  - Promotion of employer-based measures utilizing incentives to encourage employees not to commute alone.
  - New park-and-ride facilities in Rochester, Dover, and Durham or Lee.

- Bridge Alternatives – Both located to the west side of the existing Little Bay Bridges:
  - Rehabilitation and widening of the Little Bay Bridges to either six or eight lanes with the General Sullivan Bridge Rehabilitation.
  - Rehabilitation and widening of the Little Bay Bridges to either six or eight lanes with the General Sullivan Bridge Removed.

- Highway Alternatives – Either six or eight lanes along the Turnpike and Little Bay Bridges for the following Alternatives:
  - Alternative 2 in Dover
  - Alternative 3 in Dover
  - Alternative 10A in Newington
  - Alternative 12A in Newington
  - Alternative 13 in Newington

These alternatives were evaluated in more detail and subject to additional agency and public input to determine associated impacts, costs, and permitting issues which are documented in Chapter 4 of the DEIS.

E. Summary of Beneficial and Adverse Effects of Preferred Alternative

E.1 Adverse Effects

The No-Build Alternative serves as the baseline condition for comparing impacts of the Six- and Eight-lane widening alternatives. In general, future impacts would be avoided (*e.g.*, losses of wetlands or impacts on historical resources) with selection of the No-Build Alternative. In the case of some resources, the quality of an environmental resource may actually decline under the No-Build Alternative. For example, microscale (local) air quality problems would be expected to increase with the No-Build Alternatives due to higher levels of congestion and concomitant mobile source air pollution. And, noise generated by the highway will continue to increase even if the No-Build Alternative is implemented. In the case of noise impacts, the Build Alternative includes provisions for the construction of noise barriers in Dover which would not otherwise be constructed to mitigate this problem.

Socio-economics

The Preferred Alternative would require full acquisition of one commercial property and a portion of a second commercial property including a barn, both in Dover. Local tax bases would be reduced by approximately $2.2 million. The resultant effect on Newington's tax revenue would be less than $9,000, while the effect in Dover would be approximately $22,000. Indirect economic effects, *i.e.*, "secondary" or "induced" growth, may result in an additional 1,865 people and 1,897 jobs within the region influenced by this improved segment of the Spaulding Turnpike by the year 2025. This additional growth is a very small fraction of the amount of overall growth predicted for the region even if the Turnpike is not improved (*i.e.*, a total of approximately 92,841 new residents by 2025 under the No-Build Alternative).

Farmlands

There will be no active farmlands affected by the project, although 2.7 acres of prime farmland soils would be lost in Newington. These areas are not and have not been used for agriculture for decades or longer. The potential mitigation for the wetland impacts resulting from the project does involve the permanent conservation of the Tuttle Farm on Dover Point, the oldest continuously-operated farm in the country.

Wetlands

Wetland impacts resulting from the Preferred Alternative are estimated to be 20.4 acres, including impacts from the Turnpike improvements, construction of barriers to mitigate noise impacts, and estuarine impacts resulting from expansion of the bridge piers. None of the project alternatives would affect vernal pools, which are essential breeding habitat for certain types of salamanders and wood frogs. Most of this wetland impact will occur in areas directly adjacent to the existing Turnpike corridor and are therefore already impacted to some degree. Some wetlands, in fact, appear to have formed as a result of the original Turnpike construction. However, the construction of a new interchange in Newington will impact a substantial forested and riparian system associated with Pickering and Railway Brooks.

Restoration of Railway Brook is proposed as mitigation (approximately 2,700 linear feet of perennial stream), and approximately 150 to 200 acres of land preservation in Dover and Newington will help to offset these wetland impacts.

Wildlife

Given that the project area is relatively urbanized, impacts to wildlife habitat will be minor. No travel corridors were identified in the study area, and the vast majority of the area is already fragmented to the point that only relatively common, urban species would be affected. Certain portions of the study area do contain early successional habitat, which is relatively uncommon when compared to the amount of forested cover in the northeastern US. However, there could be some adverse effect resulting from the construction of the proposed Newington interchange due to increased habitat fragmentation.

Threatened and Endangered Species

Only one known location of a state-threatened plant species, the prolific knotweed (*Polygonum prolificum*) was mapped within the limits of the Preferred Alternative. Field searches for this population were unsuccessful, and the population is thought to be extirpated. Habitat for the New England cottontail, a possible candidate for Federal threatened or endangered status, was located by field study, but impacts to the species are expected to be minimal since the habitat quality is marginal.

Surface Waters

The study area is essentially defined by major surface waters including the Bellamy River, the Piscataqua River and the Little Bay. Additionally, six smaller watercourses were identified, all in Newington (Paul Brook, Railway Brook, Pickering Brook, Flagstone Brook and two unnamed streams).

A comparison of the estimated existing and proposed increases in impervious area associated with the Preferred Alternative shows that for most streams, including Railway Brook, Flagstone Brook, Paul Brook and the two unnamed tributaries, there would be a minimal increase in impervious area (*i.e.*, < 1.0 percent of drainage area). Much of the new impervious area in the Newington area would occur in the lower Pickering Brook watershed. The additional impervious area associated with Alternatives 13 (the Preferred Alternative), would represent 4.2 percent of this watershed area. Currently, about 19.0 percent of the lower Pickering Brook watershed (*i.e.*, east of Railway Brook) is estimated to be comprised of impervious area. Based on estimated impervious area changes, Alternative 13 would generate the least amount of impact to the surface waters in the study area.

The various streams on the Newington side of the project area primarily support the more tolerant warm-water fish species and other aquatic organisms. The benthic communities were determined to have low diversity and comprised of the more tolerant species that typically prevail in poor stream habitat conditions or where water quality conditions are diminished due to upstream pollution sources. Given the proposed water quality treatment measures for highway runoff, minimal impacts are anticipated to the aquatic resources in this stream.

Marine Resources

An extensive hydrodynamic model was developed for this EIS to investigate the potential effects of the project on the Little Bay/Great Bay Estuary. The model predicted only minimal changes in tidal conditions as a result of the Preferred Alternative (*i.e.*, the extension of the existing Little Bay Bridge piers). While the model predicts that the pier extension may change tidal maxima, the predicted changes are on the order of 0.1 to 0.2 inches, depending on the tidal condition and the location in the estuary. Similarly, current velocities and directions are expected to change only minimally.

Considering the relatively small magnitude of change that the hydrodynamic model predicts, it is expected that biotic changes will also be minimal. Relative to the total tidal range (approximately 9 feet), this is a negligible change. Additionally, the model demonstrates that this magnitude of change is less than the total change experienced in the estuary prior to the General Sullivan Bridge construction. However, the expansion of the bridge piers will directly impact approximately 17,000 square feet of benthic habitat.

Navigation

Hydrodynamic modeling results indicate that current velocity maxima will increase by no more than 0.5 feet per second, with changes typically only 0.3 feet per second. These potential changes represent only a slight change from the estimated 10 feet per second maximum tidal current under existing conditions.

The model predicts that current speeds will increase in some areas near the piers, while the speeds will decrease in other areas. Additionally, the model predicts that current directions will not change substantially, at least at the scale that can be resolved by the model.

Vertical and lateral clearances in the main navigation channel through the bridge area will be maintained so as not to impact navigation. Taken together with the results of the hydrodynamic modeling, it can be concluded that the project will have only minimal effects on navigation, and should not create situations that are more hazardous than the conditions already present.

Floodplain

The Preferred Alternative would affect a total of 1.2 acres of 100-year floodplain (3.9 acre-feet). The majority of this impact is associated with the expansion of the bridge piers. The floodplain impacts are considered minor in the context of the tremendous volume of Little Bay and will have a negligible effect on the base flood elevations in the area. Any effect on flooding would be influenced by changes to the hydraulic characteristics in the channel (accounted for in the hydrodynamic model), rather than by displacing floodplain volumes.

Groundwater Resources

There are no impacts to public water supply wells associated with the Preferred Alternative. However, the majority of Dover Point and a portion of the study area in Newington are mapped as a stratified-drift aquifer, a landform generally capable of producing substantial yields of groundwater. The Preferred Alternative would result in approximately 14.1 acres of new impervious surface area over these deposits, which might affect the recharge of the aquifer. To help reduce this potential impact, NHDOT will examine the use of infiltration technology during final design of the reconstructed drainage system.

Air Quality

There will be no exceedance of state or federal carbon monoxide (CO) standards with either the Six- or Eight-Lane Alternatives. At the regional level, both alternatives would be in compliance with the 1990 Clean Air Act Amendment and the New Hampshire State Implementation Plan.

The proposed project satisfies regional transportation conformity requirements. The proposed project's air quality emissions were evaluated as an improvement in the NHDOT's State Transportation Improvement Program (STIP) for fiscal years 2005 – 2007, which was reviewed by USEPA and found to be in conformance by the US Department of Transportation.

Noise

During public meetings leading up to the publication of this Draft EIS, noise impacts generated from the Turnpike were frequently raised by residents of the study area as one of their main concerns. A noise model developed for this EIS indicated that several portions of the study area are already adversely affected by noise levels. Predicted noise levels under the 2025 Build Alternative would not create any new impacts, but would perpetuate the problem. Noise barriers have therefore been proposed where practicable based on effectiveness and cost. Four such barriers are planned in Dover to mitigate noise impacts.

Community Resources

Two important recreational resources are located within the study area – Hilton Park and Bayview Park – both in Dover. The Preferred Alternative would avoid acquisition of new right-of-way from Hilton Park, although temporary impacts to the park would be unavoidable during construction. New right-of-way and grading would be required on the Bayview Park property (a.k.a., the Bellamy River Wildlife Management Area, owned by the NHF&GD), totaling less than ½ acre. Sidewalks to the park and a new driveway are proposed to improve accessibility to the park.

Cultural Resources

The Preferred Alternative manages to avoid direct impacts to all but a few historic properties (*i.e.*, properties determined eligible for listing on the National Register of Historic Places). Most notably, the Preferred Alternative proposes to rehabilitate the historic General Sullivan Bridge as a bicycle and pedestrian facility, preserving a valued and highly significant historic resource . Other affected properties include the Beane Farm, Isaac Dow House and the Portsmouth Water Booster Station in Newington and the Ira Pinkham House in Dover. While incidental property impacts occur in all of these cases, only one structure, a barn associated with the Ira Pinkham House, will be directly impacted by the project.

In addition to the historic structures, much of the study area has been determined sensitive or probably sensitive for archaeological resources, both historic and Native American. The Preferred Alternative would affect up to 18 such areas (approximately 44 acres of disturbance). Further information on these potential resources will be compiled following the public hearing as more detailed design is developed and the potentially impacted areas solidified.

Hazardous Materials

Given the long history of land use in the area, particularly the commercial/industrial and military use in Newington, there is potential for the

project to affect properties with a history of petroleum and other hazardous materials contamination. For the most part, the Preferred Alternative avoids direct impacts to such properties, and no impact to human or ecological health is anticipated. Up to 20 properties potentially impacted by the Selected Alternative may be further studied following the public hearing in order to accurately define the risk relative to the possibility of encountering contamination from hazardous materials.

E.2 Beneficial Effects

The Preferred Alternative would result in a number of beneficial effects.

Safety and Traffic Operations

The Preferred Alternative will result in safer and more efficient traffic operations in comparison to the No-Build Alternative.

- Substandard shoulder areas on the Little Bay Bridges and bridge approaches will be eliminated.
- Interchanges will be consolidated (Exits 2 and 3; Exits 5 and 6), improving spacing between interchanges, eliminating substandard geometry and providing the necessary traffic management lanes between Exits 3 and 6 to enable safe lane changes required by traffic entering and exiting the Turnpike. Traffic congestion and delays will be reduced and air quality will be improved.
- Connections to the Turnpike system will be improved at Exit 3 (Woodbury Avenue/Tradeport) and Exit 6 (US 4/Dover Point Road) improving system efficiency and eliminating circuitous travel.
- Local roadway connections will be improved:
  - Woodbury Avenue connection to Arboretum Drive (Tradeport).
  - Extension of Shattuck Way (Newington) and conversion to two-way traffic.
  - Two-way Hilton Park connector adjacent to channel.
  - Two-way connector between Spur Road and Boston Harbor Road (Dover).
- Improved pedestrian connections will be provided:
  - Connecting the east and west sides of Hilton Park.
  - Rehabilitation of the General Sullivan Bridge will maintain the important connection across the Bay.
  - Connecting the Spur Road and Boston Harbor Road neighborhoods.
- Future planning and accommodation for a rail connection traversing above the Turnpike between the Newington Branch line and the Pease Tradeport.

- Reduced travel demand and improved air quality from employer-based travel demand management (TDM) programs during construction, as well as, expanded bus service.
- Travel time during the peak hours of the day will be improved from the current approximately 10 minutes required to travel the 3.5-mile section of the Turnpike to approximately 4 minutes. In the future (2025), travel time is expected to be reduced from approximately 21 minutes (No-Build) to approximately 4 minutes with the Preferred Alternative.

Environmental Benefits

In addition to the safety and traffic operational benefits summarized above, certain beneficial environmental effects will result from the improved traffic operations of the Turnpike. For example, the reduced congestion will help to reduce transportation-related air emissions, which, at the local scale, are directly related to traffic congestion. Similarly, transportation-related energy consumption is reduced in areas of decreased congestion.

Project-related environmental mitigation will help to offset impacts to natural resources. For example, as discussed previously, approximately 150 to 200 acres of land will be permanently protected as a result of the project's proposed mitigation. Railway Brook, a former branch of Pickering Brook, will be restored to replace lost stream and wetland habitat. Also, protection of the Tuttle Farm will help preserve an historic part of New Hampshire's agricultural heritage.

Other substantial beneficial elements include:

- Noise barriers in Dover to alleviate highway-related noise impacts to residential areas;
- Rehabilitation of the historic General Sullivan Bridge; and
- Eleven extended detention basins to treat stormwater runoff and improve water quality.

F. Issues and Areas of Controversy

Through the course of numerous public meetings (16 Advisory Task Force meetings, seven Public Informational meetings, and a Dover City Council meeting), input has been received that favored various aspects of the improvement alternatives. Major issues have been contemplated concerning access, the configuration of the interchanges, environmental impacts, right-of-way requirements, the elevation of the Turnpike (opposition expressed towards elevating the Turnpike due to associated noise and visual impacts), the fate of the General Sullivan Bridge (whether to remove or rehabilitate), six lanes versus eight lanes on the Little Bay Bridges, and a multi-modal approach to meeting transportation needs.

General Sullivan Bridge

One of the primary issues throughout the EIS process has been the fate of the General Sullivan Bridge. The Bridge has not been used to carry vehicular traffic since the expansion of the Little Bay Bridge in 1984, and has been in a state of increasing deterioration for some time. The US Coast Guard required demolition of the General Sullivan Bridge (once it no longer was used for transportation purposes) as a condition of its approval of the expansion of the Little Bay Bridge. However, the bridge is considered one of the most historic in New Hampshire, and perhaps even the northeast. It therefore is protected under state and federal law. After consideration of the costs and benefits of rehabilitation and reuse of the bridge as compared to its demolition, the NHDOT identified reuse of the bridge, although more costly, as the Preferred Alternative. Although widely supported by the FHWA, NHDHR, the City of Dover, Strafford Regional Planning Commission, Advisory Task Force, and members of the public, this decision has been questioned by some who feel that the extra funding should go to other important projects in the state. This sentiment is reinforced by the fact that the state's Ten-Year Transportation Improvement Plan is substantially under funded.

Dover Toll Plaza

During the scoping phase of the EIS, it was determined that toll operations at the Dover plaza, and potential impacts of these operations on traffic operations within the study area, should not be part of the scope of study. This decision raised questions from some members of the public, who felt that the Toll Plaza should be part of the study area. However, evaluation of toll operations and revenue require a systematic review and approach.

The Dover Tolls, therefore, cannot be considered without examination of the entire toll system, which was determined to be unreasonable for this project. Changes in toll plaza location, pricing and operations require state legislative action. Recent implementation of the E-Z Pass system, which is a statewide and systemwide project, should reduce delay and congestion at all toll plazas, including the Dover facility. Additionally, previous and current traffic data indicate that congestion problems are limited to areas south of the Toll Plaza.

Access at Nimble Hill Road

At the local level, a number of concerns were expressed regarding access to the Turnpike from the existing gasoline station/convenience store adjacent to the southbound Turnpike roadway near Nimble Hill Road. Although the Turnpike is a limited access highway, this facility (an ExxonMobil station) does have direct access to the Exit 4 ramps. In order to improve safety in this area, all of the Newington alternatives eliminated this direct access, which raised concerns about how this change might affect the business. The Preferred Alternative will

allow continued access to this property via a local access road south of the property.

Noise

Another local issue was the impact of the Turnpike on noise levels in the two communities. Both Newington and Dover residents repeatedly expressed concerns about these noise levels. The noise modeling showed that a number of residences in Dover currently exceed impact thresholds established in FHWA policy on noise. Only one impacted sensitive receptor was identified in Newington, even though some residents quite far from the Turnpike had complained about noise levels. As a result of the analysis, four permanent noise barriers in Dover (none in Newington as no areas met the economic criteria) are proposed as mitigation, and the grade of the new Turnpike mainline is proposed to be generally maintained at the same level as the existing.

Aesthetics

Viewsheds from the widened Little Bay Bridges and Turnpike, and from nearby Dover residences will be affected to varying degrees. Southbound riverscape views to the east will be impacted by the increased cross-section width of the Turnpike, as well as northbound views of Little Bay. Proposed noise barriers in Dover will create a widened tunnel-like view to the motorist and affect the view of Pomeroy Cove. In addition, these barriers, while offering noise abatement to residents, will restrict views of the highway.

Hilton Park

Hilton Park was identified by the public as a valuable recreational resource and its protection emphasized during early public meetings. Planning and preliminary design endeavored to avoid impacts to Hilton Park, and to enhance the park where possible. By widening the Little Bay Bridges to the west side of the existing bridges, impacts to Hilton Park from the bridge and Turnpike widening were avoided. The current northbound access to Hilton Park will be modified, however. Exit 5 will be eliminated under the Preferred Alternative due to its proximity to Exit 6 which currently creates unacceptable traffic operations and safety conditions. These conditions notwithstanding, the upgrade of Exit 5 geometry to meet minimum standards, would have impacted both Hilton Park and the Wentworth Terrace neighborhood, which was determined to be an unacceptable solution. Rather, the existing pedestrian and one-way vehicular connection traversing under the Turnpike adjacent to the channel, which links both sides of the Park, will be upgraded to provide a two-way vehicular connection to Dover Point Road and Exit 6. In addition, the pedestrian connection linking the pedestrian/path system in the park on both sides of the Turnpike will be improved.

Secondary Growth

NHDES and the USEPA have expressed concerns that suburban development in the region would accelerate as a result of improved highway capacity. This concern is based on the perception that the Spaulding Turnpike within the study area acts as a transportation bottleneck and therefore serves to constrain economic development north of the Little Bay Bridges. To assess this concern, the Draft EIS assesses potential "indirect" economic effects, including a discussion of potential land use impacts.

An economic forecasting and policy analysis model was used to evaluate indirect social and economic impacts on 33 communities located in the socio-economic study area region. A No-Build analysis revealed that the present rate of fairly brisk growth (in terms of population, employment and income) experienced by these communities since the 1970s would likely continue, but at a slightly slower rate. However, an evaluation of possible indirect effects due to improvements on the Spaulding Turnpike indicated a small impact on population and employment growth rates, and the corresponding indirect land development and environmental impacts.

G. Other Governmental Actions

The NHDOT and FHWA are not aware of any additional federal actions or any state or local government actions within the project study area that would conflict with the proposed action.

H. Major Unresolved Issues

Following the extensive public participation process leading up to the publication of this Draft EIS, there are no major unresolved issues associated with the project.

I. Federal and State Actions Required for the Implementation of Proposed Action

- An Individual Wetland Permit application has been submitted jointly to the US Army Corps of Engineers (USACOE) and New Hampshire Department of Environmental Services (NHDES) for their approval. This project's development has followed the USACOE's Highway Methodology, which is designed to integrate their Section 404 permitting process with the requirements of the National Environmental Policy Act (NEPA).

- A joint Public Hearing with the NHDES and USACOE will be conducted to facilitate the issuance of the Section 404 wetland permit and NHDES dredge and fill permit.

- A Section 401 Water Quality Certificate is required from NHDES before the Section 404 permit can be issued. This review will determine whether the proposed action meets all state water quality standards.

- The project will require a permit from the US Coast Guard (USCG) under its permitting authority pursuant to Section 9 of the Rivers and Harbors Act of 1899 and the General Bridge Act of 1946. Under the General Bridge Act of 1946, the USCG is responsible to preserve the public right of navigation and to prevent interference with interstate or foreign commerce. Their review will require that the bridges provide for the reasonable needs of navigation, as well as the reasonable needs of land traffic (*i.e.*, highway users).

- Pursuant to the National Pollution Discharge Elimination System (NPDES), a Notice of Intent (NOI) application to the US Environmental Protection Agency (USEPA) for a General Permit for Construction Activity is required before construction can begin. A Stormwater Pollution Prevention Plan consistent with NHDOT Standard Specifications, which incorporate Best Management Practices (BMPs) for minimizing soil erosion and sediment movement, will be developed and submitted with this application.

- Concurrence by the National Marine Fisheries Service (NMFS) that the Selected Alternative will either not have an "adverse effect" or that the "adverse effect" is "not substantial" on Essential Fish Habitat (EFH) is required.

- Under Section 4(f) of the US Department of Transportation Act as amended by the Federal-Aid Highway Act of 1968 (Public Law 90-495, 49 USC 1653), FHWA will need to make a determination that there is no feasible and prudent alternative to the use of land from Hilton Park, Bayview Park, and the affected historic resources before the project can advance.

- A Record of Decision (ROD) issued by FHWA is required before this project can proceed to final design. The ROD is issued no sooner than 30 days after release of the Final EIS.

Figures

New Hampshire DOT
Department of Transportation

Legend:

- SURFACE WATERS
- TOWNLINE
- STATELINE
- STUDY AREA BOUNDARY

EXIT 1	GOSLING ROAD / PEASE BOULEVARD
EXIT 2	FOX RUN ROAD
EXIT 3	WOODBURY AVENUE
EXIT 4	NIMBLE HILL ROAD / SHATTUCK WAY
EXIT 4N	MEDIAN TURNAROUND (DISCONTINUED IN 2005)
EXIT 5	WENTWORTH TERRACE (HILTON PARK)
EXIT 6	US ROUTE 4 / DOVER POINT ROAD

0 750 1500 Feet

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Figure 1.2-2
Project Study Area

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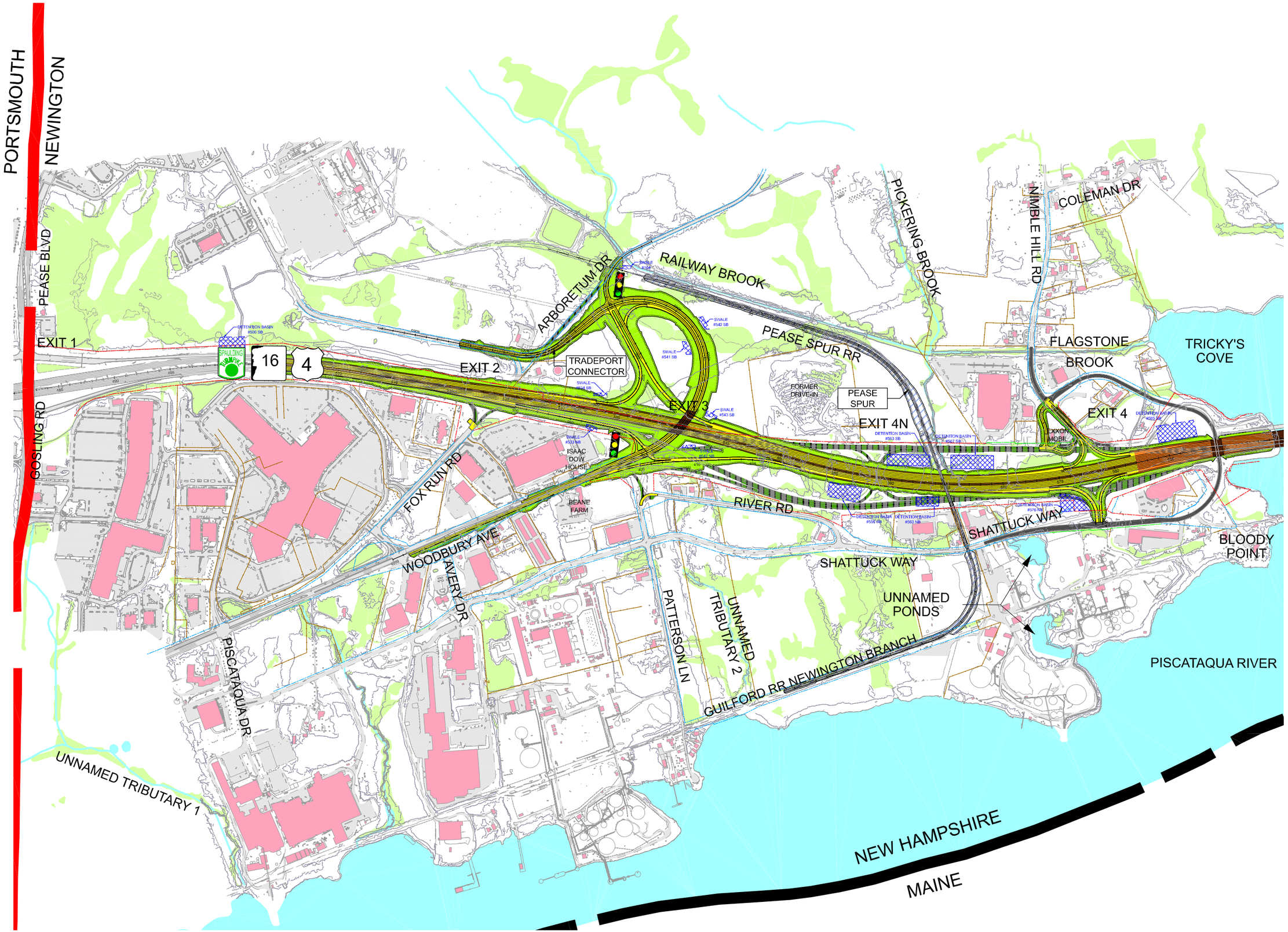

New Hampshire DOT
Department of Transportation

Legend:

- Existing Roadway
- Existing Building
- Existing Wetland
- Existing Property Lines
- Proposed Roadway
- Proposed Bridge
- Proposed Rail Corridor
- Proposed Acquisition
- Pavement Removal
- Existing LAROW
- Existing CAROW
- Existing ROW
- Proposed LAROW
- Proposed CAROW
- Proposed ROW
- Newington Interim Safety Improvements

0 400 800 Feet

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Figure 2.4-25
Newington Alternative 13

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New Hampshire DOT
Department of Transportation

DURHAM
ROCKINGHAM COUNTY
STRAFFORD COUNTY
LITTLE BAY
SCAMMELL BRIDGE
4
ROYALS COVE
BOSTON HARBOR RD
SPUR RD
BAYVIEW PARK
CLEARWATER DR
BELLAMY RIVER
TRICKY'S COVE
HILTON PARK
DOVER POINT RD
EXIT 6
EXIT 5
ADAPTATIONS
POMEROY COVE
COTE DR
DOVER POINT RD
HILTON RD
TOLL PLAZA
16
GENERAL SULLIVAN BRIDGE
LITTLE BAY BRIDGES
DOVER POINT
HILTON PARK
HILTON DR
WENTWORTH TER
SHATTUCK WAY (FORMERLY RIVER RD)
BLOODY POINT
HOMESTEAD LN
PINEVIEW LN
PEARSON LN
DOVER POINT RD
DOVER
NEWINGTON
NEW HAMPSHIRE
MAINE
PISCATAQUA RIVER

Legend:

- Existing Roadway
- Existing Building
- Existing Wetland
- Existing Property Lines
- Proposed Roadway
- Proposed Bridge
- Proposed Rail Corridor
- Proposed Acquisition
- Pavement Removal
- Existing LAROW
- Existing CAROW
- Existing ROW
- Proposed LAROW
- Proposed CAROW
- Proposed ROW
- Newington Interim Safety Improvements

N

0 400 800 Feet

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Figure 2.4-28
Dover Alternative 3

Newington - Dover, NH NHS-027-1(37)/11238

Summary of Roadway and Bridge Impacts (Eight Lanes)

IMPACTS	UNIT OF MEASUREMENT	NO BUILD	ROADWAY SEGMENT NEWINGTON			BRIDGE SEGMENT WIDEN WEST		ROADWAY SEGMENT DOVER	
			ALT 10A	ALT 12A	ALT 13	Remove GSB	Rehab GSB	ALT 2	ALT 3
WATER QUALITY, AQUATIC LIFE, & FISHERIES	Number of Perennial Stream Crossings	0	1	1	1	0	0	0	0
	Length of Perennial Stream Crossings (Feet)	0	420	330	290	0	0	0	0
	Number of Intermittent Stream Crossings	0	0	0	0	0	0	0	0
	Length of Intermittent Stream Crossings (Feet)	0	0	0	0	0	0	0	0
GROUNDWATER QUALITY	Stratified-Drift Aquifer Under New Roadway Area (Acres)	0	4.0	4.0	4.6	1.2	1.6	8.1	8.3
	Number of Well Head Protection Area (WHPA) crossings	0	0	0	0	0	0	0	0
FLOODPLAINS	Floodplain Area Impacted (Acres)	0	0	0	0	0.4	0.4	1.5	0.8
	Floodplain Volume Impacts (Acre-feet)	0	0	0	0	2.7	2.7	1.5	1.2
WETLANDS	TOTAL Wetland Impacted (Acres)	0	13.6	12.8	11.6	1.1	0.9	8.2	7.9
PEM		0	4.7	4.7	3.2	0.2	0.2	2.6	2.5
PFO		0	6.7	6.4	6.8	0.2	0.2	5.4	5.4
POW		0	0	0	0	0	0	0	0
PSS		0	2.2	1.7	1.6	0	0	0.1	0
E1/E2		0	0	0	0	0.6	0.5	0.1	0
THREATENED & ENDANGERED SPECIES	Number of Populations Impacted	0	0	0	0	0	0	0	0
VISUAL	Impacts to Views from and to the Highway (Qualitative)	N/A	Mod	Mod	Low/Mod	Low	Low	Mod	Mod
ARCHAEOLOGICAL	Number of Sensitive Areas Affected (Native American / Historic)	0	9	11	8	5	6	9	8
	Verified Sites and Cemetaries (ac)	0	0	0.03	0	0.2	0.2	0.01	0
	Exhibits Sensitivity (ac)	0	6.6	9.5	5.3	1.8	1.9	12.6	14.4
	Exhibits Probable Sensitivity (ac)	0	23.1	23.9	20.4	3.5	2.8	0.6	0.6
HISTORICAL	Number of Potentially Eligible or Listed Sites Impacted (Adverse Effect)	0	3	3	3	1	1	1	1
RIGHT-OF-WAY DISPLACEMENT	Number of Residential Total Property Acquisitions	0	1	0	0	0	0	0	0
	Number of Business Total Property Acquisitions	0	0	0	0	1	1	1	1
PUBLIC PARKS & RECREATIONAL LAND[1]	Number of Affected Recreational 4(f) Properties	0	0	0	0	1	1	1	1
	Area of Affected Recreational 4(f) Properties (Acres)	0	0	0	0	0.002	0.002	0.4	0.4
PETROLEUM & HAZARDOUS MATERIALS	Number of Potentially Contaminated Properties Impacted	0	19	19	19	0	0	1	1
FARMLANDS	Active Farmlands Impacted (Acres)	0	0	0	0	0	0	0	0
Important Farmland Soils (Acres)	Prime	0	3.8	7.8	2.7	0	0	0	0
	Unique	0	0	0	0	0	0	0	0
	Statewide	0	0	1.5	0	0	0	0	0
	Local	0	0.01	0.01	0.01	0	0	0	0
WILDLIFE HABITAT[2]	High Value Habitat Impacted (Acres)	0	24.9	26.7	20.9	2.3	2.6	3.6	3.7
Riparian Areas	Riparian Impact Areas (Acres)	0	6.8	6.9	4.6	0	0	0	0
Unfragmented Lands (>25 acres)	Impacts to Unfragmented Lands (Acres)	0	12.0	13.1	9.0	0	0	0	0
HYDRODYNAMICS	Change in Tidal Flow Characteristics	0				Minimal	Minimal		
AIR	Microscale CO Exceedances (2025)	0	0	0	0	0	0	0	0
NOISE	Number of Receptors Exceeding FHWA Abatement Criteria	0	1	1	1	0	0	85	85

NOTES:
1 Hilton Park is located in the Bridge Segment of the study area. Bayview Park is located in the Dover portion.
2 High Value Habitat and other wildlife habitat measures are based on mapping by NHF&GD (Coarse Filter Analysis).

Preferred Alternative

Figure 2.5-1
Summary of Environmental Impacts

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Newington - Dover , NH 11238

Summary of Costs for the Newington - Dover 8-lane Alternatives

COST FACTORS AND TRANSPORTATION DATA		ROADWAY SEGMENT NEWINGTON			BRIDGE SEGMENT		ROADWAY SEGMENT DOVER		COMBINED SEGMENT COMPARISON RANGE		
					WIDEN LITTLE BAY BRIDGE (LBB) TO THE WEST & REHABILITATE GENERAL SULLIVAN BRIDGE (GSB) FOR USE AS MULTI-USE PATH	WIDEN LITTLE BAY BRIDGE (LBB)TO THE WEST, INCLUDE MULTI-USE PATH AND REMOVE GENERAL SULLIVAN BRIDGE (GSB)			MINIMUM ROADWAY LENGTH / NUMBER OF BRIDGES	MAXIMUM ROADWAY LENGTH / NUMBER OF BRIDGES	
		ALT 10A	ALT 12A	ALT 13	LBB w /GSB	LBB w/o GSB	ALT 2	ALT 3	(ALT 13, LBB w/o GSB, ALT 2)	(ALT 12A, LBB w/ GSB, ALT 3)	
TRANSPORTATION DATA	LENGTH OF FREEWAY (LANE MILES)	10.6	10.6	10.6	5.0	5	7.6	7.6	**23.2**	**23.2**	LANE MILES
	LENGTH OF RAMPS (LANE MILES)	2.3	2.1	2.5	0	0	2.5	2.4	**5.0**	**4.5**	LANE MILES
	LENGTH OF LOCAL ROADWAYS (LANE MILES)	6.2	6.6	5.0	1.1	1.1	4.1	4.6	**10.2**	**12.3**	LANE MILES
	TOTAL LENGTH OF IMPROVEMENTS (LANE MILES)	**19.1**	**19.3**	**18.1**	**6.1**	**6.1**	**14.2**	**14.6**	**38.4**	**40.0**	LANE MILES
	NUMBER OF BRIDGES	**3**	**7**	**1**	**1**	**1**	**1**	**2**	**3**	**10**	EACH
COST FACTORS	**ALL COSTS ARE IN MILLIONS OF DOLLARS (FY 2005)**								**LOWEST COMBINED SEGMENT COST (ALT 13, LBB w/o GSB, ALT 2)**	**HIGHEST COMBINED SEGMENT COST (ALT 12A, LBB w/ GSB, ALT 3)**	**$**
ROADWAY COST	ALL ROADWAY COSTS ASSOCIATED w/ FREEWAY, RAMPS & LOCAL ROADS	33.6	35.8	31.3	11.2	11.2	30.5	30.6	**73.0**	**77.6**	MILLIONS
RAIL ACCOMMODATION COST (1)	ALL ROADWAY AND BRIDGE COSTS ASSOCIATED WITH ACCOMMODATING PEASE SPUR	1.1	1.9	0.1					0.1	1.9	MILLIONS
	TOTAL ROADWAY COST	**34.7**	**37.7**	**31.4**	**11.2**	**11.2**	**30.5**	**30.6**	**73.1**	**79.5**	MILLIONS
BRIDGE COST	COST FOR ALL BRIDGES (EXCEPT LITTLE BAY, GENERAL SULLIVAN, AND PEASE SPUR)	11.7	14.7	8.4	1.8	1.8	6.1	8.9	16.3	25.4	MILLIONS
	WIDEN LITTLE BAY BRIDGE TO EIGHT LANES				55.5	63.8			63.8	55.5	MILLIONS
	REHABILITATE GENERAL SULLIVAN BRIDGE FOR PEDESTRIAN / BICYCLE USE				23.0				0.0	23.0	MILLIONS
	REMOVE GENERAL SULLIVAN BRIDGE					5.0			5.0	0.0	MILLIONS
	TOTAL BRIDGE COST	**11.7**	**14.7**	**8.4**	**80.3**	**70.6**	**6.1**	**8.9**	**85.1**	**103.9**	MILLIONS
ROADWAY AND BRIDGE COST TOTAL		**46.4**	**52.4**	**39.8**	**91.5**	**81.8**	**36.6**	**39.5**	**158.2**	**183.4**	MILLIONS
PRELIMINARY ENGINEERING	COST ASSOCIATED WITH DESIGN ENGINEERING, GEOTECHNICAL EVALUATION	**3.7**	**4.2**	**3.2**	**7.3**	**6.5**	**2.9**	**3.2**	**12.6**	**14.7**	MILLIONS
RIGHT OF WAY COSTS (2)	ESTIMATED COST FOR RIGHT OF WAY ACQUISITIONS	**2.1**	**2.2**	**1.0**	**0.0**	**0.0**	**1.1**	**1.2**	**2.1**	**3.4**	MILLIONS
TOTAL SEGMENT COST		**52.2**	**58.8**	**44.0**	**98.8**	**88.3**	**40.6**	**43.9**	**172.9**	**201.5**	MILLIONS
BUS COSTS (3)	COMBINATION OF THREE BUS ALTERNATIVES AND ENHANCED TRANSFER POINT	**5.0**							**5.0**	**5.0**	MILLIONS
RAIL COSTS (4)	RANGE OF RECOMMENDED NEAR TERM AND FUTURE RAIL SERVICE	**1.7 TO 13.5**							**1.7** #	**1.7** #	MILLIONS
PARK AND RIDE COSTS (5)	COMBINATION OF TWO PARK AND RIDE LOTS IN ROCHESTER AND DOVER	**3.6**							**3.6**	**3.6**	MILLIONS
MITIGATION AND ENHANCEMENT COSTS	WETLAND CREATION, RESTORATION, PRESERVATION. (INCLUDING RIGHT OF WAY AND CONST COST)	**6.0**							**6.0**	**6.0**	MILLIONS
											MILLIONS
RANGE OF TOTAL COSTS									**189.2**	**217.8**	MILLIONS

THE COLOR SHOWN IN THE SEGMENT COLUMNS ABOVE IDENTIFIES THE DEPARTMENT'S **PREFERRED ALTERNATIVE.**

w/ NEAR TERM RAIL COST ALTERNATIVE 1 C

(1) THE **RAIL ACCOMMODATION COST** FOR NEWINGTON ALTERNATIVES 10A, 12A AND 13 ARE FOR ONLY THOSE NECESSARY ROADWAY ELEMENTS (BRIDGE, EXCAVATION AND DRAINAGE COSTS) THAT NEED TO BE CONSTRUCTED AS PART OF THESE ALTERNATIVES TO ALLOW FOR THE OPERATION OF THE PEASE SPUR, IF REACTIVATED. FOR ALTERNATIVE 13, THE COST TO ACCOMMODATE THE SPUR IS THE COST ASSOCIATED WITH THE MEDIAN PIER SUBSTRUCTURE ONLY ($0.1 MILLION), NO OTHER ROADWAY ELEMENTS NEED TO BE CONSTRUCTED AS PART OF ALTERNATIVE 13 TO ACCOMMODATE THE RR SPUR. IF THE SPUR IS REACTIVATED, THE RAIL CAN BE ELEVATED (OVERPASS) WITHOUT SIGNIFICANTLY IMPACTING THE OPERATION OF THE TURNPIKE (ESTIMATED COST IS $4.4 MILLION).

(2) ESTIMATED COST FOR RIGHT OF WAY ACQUISITIONS (BASED UPON 2004 MUNICIPAL ASSESSMENT RECORDS AND AVERAGE LAND VALUES IN NEWINGTON AND DOVER.) DOES NOT INCLUDE APPRAISAL OR OTHER ADMINISTRATIVE COSTS

(3) COSTS ASSOCIATED WITH IMPROVING BUS SERVICE IN SEACOAST AREA INCLUDE A COMBINATION OF ALTERNATIVES: BUS ALTERNATIVE 1 @ $0.4 MILLION; BUS ALTERNATIVE 2 @ $0.4 MILLION; BUS ALTERNATIVE 3 @ $4.1 MILLION. IN ADDITION, THE COST ASSOCIATED WITH AN ENHANCEMENT OF THE EXISTING BUS TRANSFER POINT AT THE FOX RUN MALL IS $110,000.

(4) COSTS ASSOCIATED WITH IMPROVING RAIL SERVICE INCLUDE A RANGE OF ALTERNATIVES: FOR NEAR TERM, ALTERNATIVE 1C IS RECOMMENDED WHICH EXPANDS THE EXISTING *DOWNEASTER* SERVICE ($1.7 MILLION); ALTERNATIVES 1A &1B INVOLVE FUTURE EXPANSION OF SERVICE INTO DOVER AND ROCHESTER (RANGE OF FUTURE COSTS ARE $11.3 TO $11.8 MILLION)

(5) THE COSTS ASSOCIATED WITH THE CONSTRUCTION OF A PARK AND RIDE LOT IN DOVER ARE $2.55 MILLION. THE COSTS FOR THE PARK AND RIDE LOT IN ROCHESTER RANGES FROM $1.0 TO $1.1 MILLION DEPENDING UPON WHICH SITE IS SELECTED.

PREFERRED ALTERNATIVE COST (MILLIONS)	
NEWINGTON SEGMENT (ALT 13)	44.0
BRIDGE SEGMENT (LBB w/GSB)	98.8
DOVER SEGMENT (ALT 3)	43.9
BUS SERVICE	5.0
RAIL SERVICE	1.7
PARK AND RIDE LOTS	3.6
MITIGATION	6.0
TOTAL	203.0

SUMMARY OF COSTS 8-LANE ALTERNATIVES
FIGURE 2.6-2